Center Innovation Fund: JSC CIF

Core Flight Software (CFS) Maturation Towards Human Rating

Completed Technology Project (2011 - 2012)

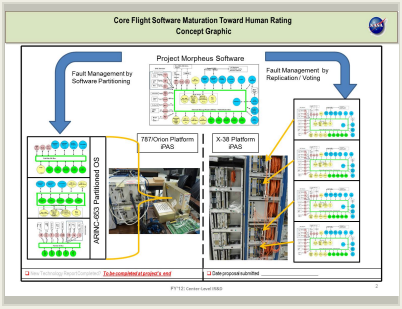
Project Introduction

The research performed under this proposal will assess the applicability of the Core Flight Software (CFS) within human-rated type architectures by prototyping and demonstrating its application on a representative set of architectures. This research will identify any additions and changes needed to support such systems. The project will prototype and productize the CFS product addition as necessary to enable broad reuse (part of a multi-year effort). Specifically, this research addresses the utilization of CFS within architectures typically used on human spacecraft -- those employing a high degree of fault isolation and redundancy. The CFS framework will be prototyped on quad-redundant voting architectures as well as within a partitioned operating system.

The Core Flight Software (CFS) system developed by Goddard Space Flight Center, through experience on Morpheus, has proven to be a quality product and a viable candidate for institutional software reuse on a broad range of NASA spaceflight projects, including in the near term MMSEV, HDU, spacesuits, downmass capsule, and OCO-3. The productivity and success seen with it can be extrapolated into tremendous savings if applied to human spaceflight software, but diligence needs to be done in assessing its use for large human-rated systems. If deemed viable, the potential exists to reform the state of practice in building human spacecraft software systems by capitalizing upon reuse and realizing a great potential for cost, schedule, and risk reduction.

Anticipated Benefits

The Core Flight Software (CFS) system developed by Goddard Space Flight Center, through experience on Morpheus, has proven to be a quality product and a viable candidate for institutional software reuse on a broad range of NASA spaceflight projects, including in the near term MMSEV, HDU, spacesuits, downmass capsule, and OCO-3. The productivity and success seen with it can be extrapolated into tremendous savings if applied to human spaceflight software, but diligence needs to be done in assessing its use for large human-rated systems. If deemed viable, the potential exists to reform the state of practice in building human spacecraft software systems by capitalizing upon reuse and realizing a great potential for cost, schedule, and risk reduction.



Project Image Core Flight Software (CFS) Maturation Towards Human Rating

Table of Contents

Core Flight Software (CFS) Maturation Towards Human Rating

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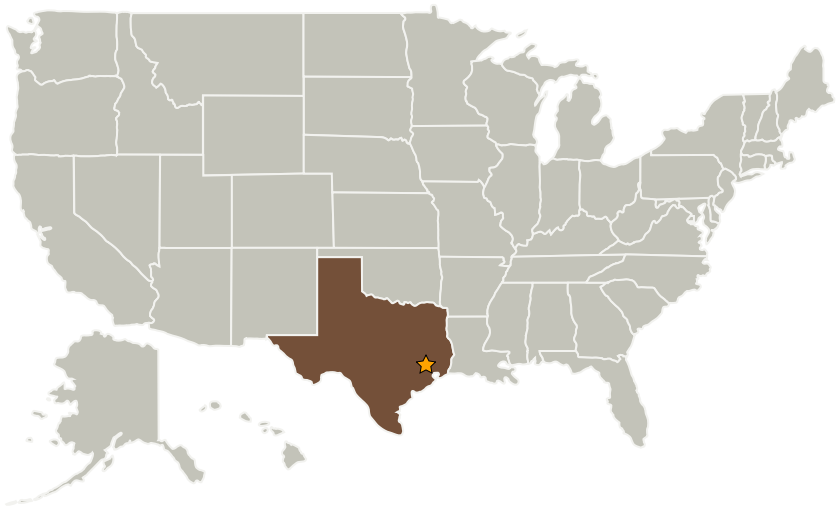
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations
Texas

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Center Innovation Fund: JSC CIF

Project Management

Program Director:

Michael R Lapointe

Program Manager:

Carlos H Westhelle

Project Manager:

Lorraine E Prokop

Principal Investigator:

Lorraine E Prokop

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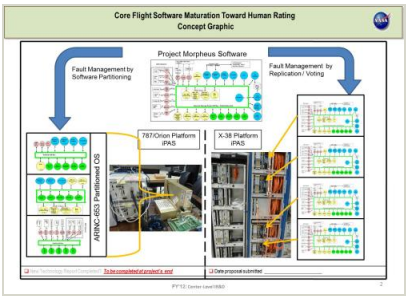
Images



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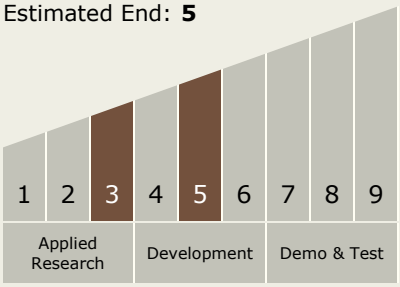
Project Image Core Flight Software (CFS) Maturation Towards Human Rating
(https://techport.nasa.gov/image/2341)

Technology Maturity (TRL)

Start: **3**
Estimated End: **5**



Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.3 Human Health and Performance
    - TX06.3.3 Behavioral Health and Performance